B2 cancel

15. The electroactive bender actuator of claim 10 wherein said coating is applied using a vapor deposition process.

16. The electroactive bender actuator of claim 10 wherein said coating is polytetrafluoroethylene.

17. The electroactive bender actuator of claim 10 wherein said coating is parylene.

✓Please cancel claim 18.

REMARKS

Claims 1-18 are pending in the present application. Applicants thank the Examiner for his careful consideration of this application. Claims 1, 9-10, and 12-17 are amended, and claims 7-8, 11, and 18 are cancelled from this application. Applicants believe this amendment and accompanying remarks overcomes the rejection of claims 1-18 and respectfully request examination and reconsideration of claims 1-6, 9-10, and 12-17 in light of these remarks.

I. Anticipation Rejection

Claims 1, 2, and 8 were rejected under § 102(a) as being anticipated by US. Patent 2,814,575 issued to Lange. Claim 10 was rejected under § 102(a) as being anticipated by U.S. Patents 2,478,223 issued to Argabrite, 3,076,903 issued to Schwartz, or 2,756,353 issued to Samsel. Applicants respectfully submit that the amendments of claims 1 and 10 overcome the rejection of claims 1, 2, and 10, and Applicants have cancelled claim 8 from the present application.

Lange discloses a piezoelectric actuator having a ceramic plate 43 disposed between electrodes 44 and 45. From Fig. 3, it can be seen that the electrodes are shorter than the ceramic plate, and thus the edges of the electrodes are insulated from each other by the

plate. An insulating material 51 surrounds the actuator to prevent the electrodes from being short-circuited when immersed.

Applicants believe that claim 1, as amended, is not anticipated by Lange. First, claim 1 recites electrodes having offset edges, and, as stated, Lange discloses electrodes having generally planar edges in Fig. 3. Second, claim 1 recites the coating applied by vapor deposition. Lange does not disclose an application method for the insulating material. Claim 2 depends from claim 1, and Applicants believe it too is not anticipated for similar reasons.

Argabrite, Schwartz, and Samsel disclose piezoelectric devices having a ceramic layer with electrodes disposed on both sides of the layer. Applicants believe that claim 10, as amended, is not anticipated by these references. Claim 10 recites having an insulating coating applied to the outer edges of the electrodes and the ceramic layer.

II. Obviousness Rejections

Claims 3-6 and 9 were rejected under § 103(a) as being unpatentable over US. Patent 2,814,575 issued to Lange. Claims 7 and 11-18 were rejected under § 103(a) as being unpatentable over Schwartz, Samsel, or U.S. Patent 5,589,725 issued to Haertling in view of Lange, U.S. Patent 4,689,517 issued to Harnden et al., or U.S. Patent 6,274,966 issued to Kohno et al. Applicants respectfully submit that the amendment of claim 10 as discussed above overcomes the rejection of claims 12-17, and Applicants have cancelled claims 7, 11, and 18 from the present application.

Haertling discloses a prestressed piezoelectric actuator having a ceramic layer, a top electrode 30 disposed across the top surface of the ceramic layer, and a bottom electrode 32 disposed around the edge of the bottom surface of the ceramic layer. As seen in Fig. 11 the edges of the top electrode do not align with the edges of the ceramic layer or the bottom electrode.

Harnden discloses a piezoelectric switching device 14 mounted in a gastight enclosure 11. The device has electrodes disposed on both sides of a ceramic layer. An insulative cap is diposed around one end of the device to prevent the electrodes from contacting the conductive surfaces.

Kohno discloses a piezoelectric actuator having a ceramic layer 26 and electrodes 31 and 32. Kohno does not disclose having an insulative coating.

Applicants believe that claims 12-17 are not obvious in light of the cited references due to the amendment of claim 10. The mere possibility that the prior art could be modified so as to result in the claimed invention would not have made the modification obvious without some reasonable suggestion or motivation in the art to make the modification or combination suggested by the Examiner. In this instance, there is no such suggestion in the cited prior art. The Examiner has identified no recognition in the art that coating the aligned edges of a piezoelectric bender is generally useful. In fact, the art which does disclose a coating has either 1) a coating about the entire device or 2) a coating insulating the electrodes from other conductive sources.

III. Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. It is respectfully urged that the instant application is patentable and is now in condition for allowance. Should the Examiner believe that an interview would facilitate an early disposal of the application, Applicants' undersigned attorney invites a telephone call at the below listed number.

Respectfully submitted,

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Marked Up Copy of Amendments pursuant to 37 CFR 1.121

Title: COATED ELECTROACTIVE BENDER ACTUATOR
Application No. 09/818,308
Attorney Docket No. 99-600

1. An electroactive bender actuator, comprising:

a pair of spaced electrodes having outer edges that are offset from one another;

an electroactive layer having an outer edge and disposed at least in part between and coupled with said electrodes; and

an insulating coating [operable to be] applied by vapor deposition covering at least a portion of an outer surface of said actuator.

2. The electroactive bender actuator of claim 1 wherein said coating covers the entire outer surface of said actuator.

3. The electroactive bender actuator of claim 1 wherein said coating is silicon impregnated with aluminum oxide.

4. The electroactive bender actuator of claim 1 wherein said coating is phosphate glass filled with chromium carbide.

5. The electroactive bender actuator of claim 1 wherein said coating is polytetrafluoroethylene.

6. The electroactive bender actuator of claim 1 wherein said coating is parylene.

Please cancel claim 7.

Please cancel claim 8.

9. The electroactive bender actuator of claim 1 wherein only the outer edges of said electrodes [electrode layers] and said electroactive layer are coated.

10. An electroactive bender actuator, comprising:

a pair of spaced electrode layers having a plurality of outer edge surfaces, at least one of the outer edge surfaces of both of the electrode layers [that are] generally aligned to lie in a common [planes] plane; and

an electroactive layer disposed at least in part between and coupled with said electrode layers and having a plurality of outer edge surfaces at least one of which is also generally aligned to lie in the common plane; and

an insulating coating covering the outer edge surfaces of said electroactive and electrode layers which lie in the common plane.

Please cancel claim 11.

12. The electroactive bender actuator of claim [11] 10 wherein said coating covers the entire outer surface of said actuator.

13. The electroactive bender actuator of claim [11] 10 wherein said coating is silicon impregnated with aluminum oxide.

14. The electroactive bender actuator of claim [11] 10 wherein said coating is phosphate glass filled with chromium carbide.

15. The electroactive bender actuator of claim [11] 10 wherein said coating is applied using a vapor deposition process.

16. The electroactive bender actuator of claim [11] 10 wherein said coating is polytetrafluoroethylene.

17. The electroactive bender actuator of claim [11] 10 wherein said coating is parylene.

Please cancel claim 18.